Category 2 Streams

Large streams in the south end of the Lake Sammamish Basin that currently do not support many kokanee but have the potential to support a large run.

- Issaquah Creek
- Tibbetts Creek

Issaquah Creek

Goal/Vision

The goal for Issaquah Creek is to have a self-sustaining kokanee spawning aggregation (estimated capacity: 10,000 adults/year) that spawns throughout the basin and is maintained in the long term by natural production. Historic observations (circa 1930s) indicated there was a strong summer/early run of kokanee run in Issaquah Creek. The KWG anticipates that a winter/late kokanee population in Issaquah Creek can be established to previously observed levels of kokanee spawners.

Issaquah Creek (WRIA #08.0178) is the largest tributary to Lake Sammamish and is located in the south part of the Lake Sammamish basin (Figure 10). Headwaters include Carey Creek and Holder Creek; where these two streams meet is the start of Issaquah Creek. The WRIA 8 stream catalog (Williams et al. 1975) classifies Holder Creek as the upper mainstem of the Issaquah Creek system. Issaquah Creek extends over 11 stream miles from Lake Sammamish to the confluence of Holder Creek and Carey Creek. Holder Creek extends an additional 6 miles. Other major tributaries include McDonald Creek, Fifteen Mile Creek, East Fork Issaquah Creek, and North Fork Issaquah Creek. The mouth of Issaquah Creek and the lower mile of the creek are in the Lake Sammamish State Park. Much of East Fork Issaquah Creek runs in close proximity to I-90. The Issaquah Fish Hatchery is located on the mainstem of Issaquah Creek at approximately rivermile 3. The lower part of the basin, which is within the Urban Growth Area, is urbanized with numerous residential, commercial, and light industrial developments. Land use in the upper basin, which is outside the Urban Growth Area, consists primarily of low-density residential and open space or state park.

Historically, Issaquah Creek was primarily used by summer/early-run kokanee (Berge and Higgins 2003). These fish began spawning during the first week of August, with the peak of spawning during the last week of August, and the end of spawning occurring during the second week of September. An estimated 15,000 summer/early-run kokanee were present in Issaquah Creek in 1975 but by 2001, no kokanee were observed. The summer/early-run is currently presumed extinct. Historic records indicate that winter/late-run kokanee did not appear to appreciably use Issaquah Creek.

Although Issaquah Creek is a large system with a large amount of potential spawning area, few adult kokanee have been observed in recent years. However, there has been little effort to directly monitor their abundance in this system. Issaquah Creek is more difficult to survey than other kokanee creeks because of its larger size and deeper waters. In recent years, kokanee have been occasionally observed in East Fork Issaquah Creek and at the Issaquah Fish Hatchery.

There are no major obstacles to kokanee migration in Issaquah Creek. A fish ladder at the Issaquah Fish Hatchery weir allows fish to migrate further upstream (Figure 10). When anadromous salmonids are being diverted at the weir into holding ponds, some kokanee may be diverted as well. These kokanee are often collected and moved upstream of the hatchery. The diversion dam (approximately rivermile 3.7) for the Issaquah Fish Hatchery's water supply was removed in 2013 and replaced with a series

of rock weirs to restore fish passage to upstream reaches.

With the completion of the passage project at the weir, the major enhancement project for Issaquah Creek is a supplementation program to help re-establish a viable kokanee population (Table 9). The large kokanee run in other tributaries in 2012-13 allowed for an unanticipated opportunity to release kokanee fry into Issaquah Creek in the spring of 2013. Broodstock for Issaquah Creek were taken from Ebright, Laughing Jacobs, Lewis, and Zaccuse creeks. Approximately 84,700 kokanee fry were released into Issaquah Creek at the Issaquah Fish Hatchery. This project will continue during the upcoming years if a large kokanee run is present in other tributaries and the egg-take goals for the main spawning tributaries are met.

More comprehensive spawning surveys of Issaquah Creek and its tributaries are also needed to determine the extent that adult kokanee are currently using this stream system. This will be especially valuable in light of both the recent restoration of passage above the Issaquah Fish Hatchery diversion and the spring 2013 release of fry in the creek. The latter could result in a substantial number of kokanee returning to the creek in the fall of 2015.

Additional information on Issaquah Creek can be found in the following reports: City of Issaquah (2011), King County (1996, 2013), and The Watershed Company (2005, 2006).

Figure 10. Issaquah Creek at the WDFW Issaquah Fish Hatchery weir system, November 10, 2009 (photo credit: Roger Tabor, USFWS).

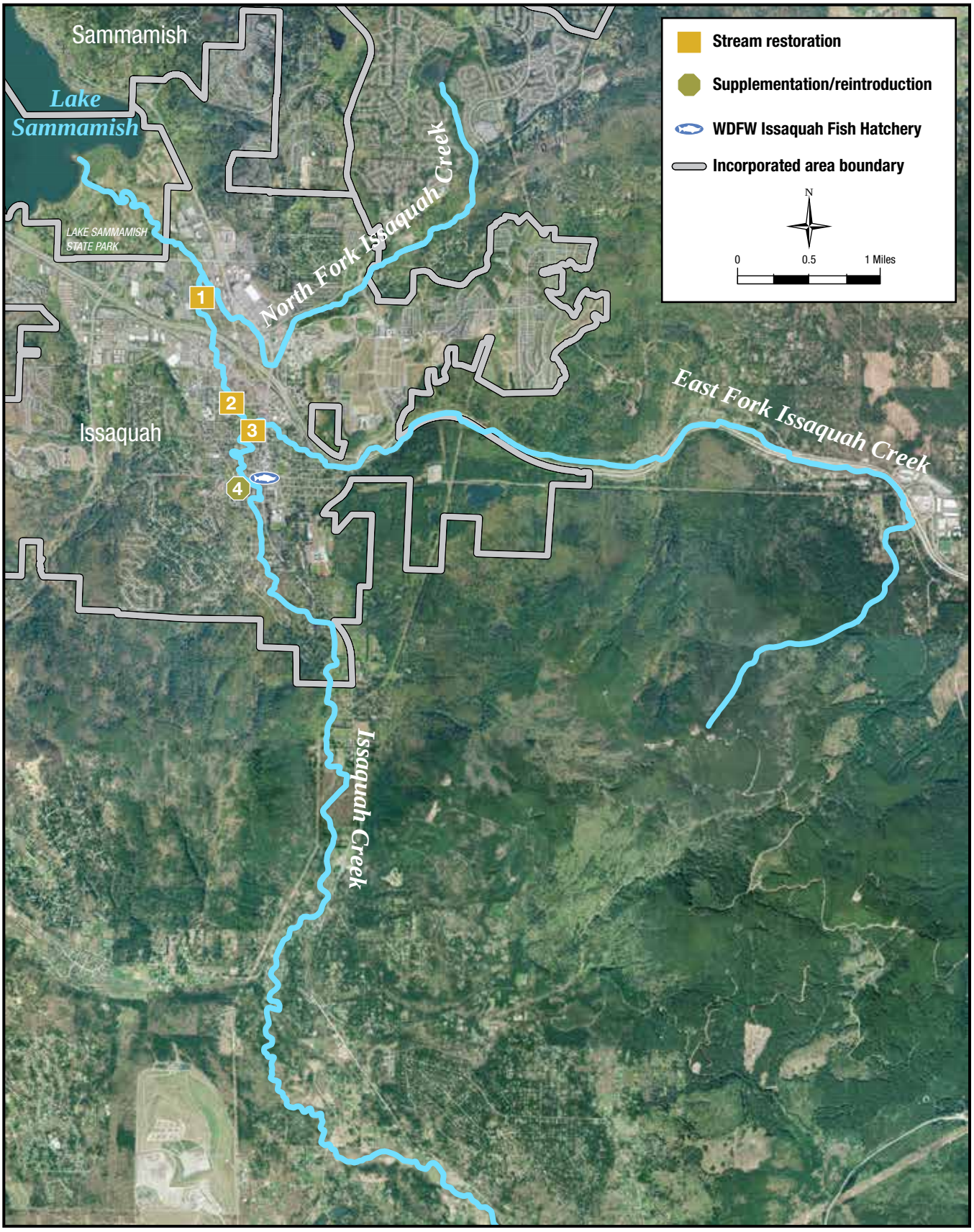

Figure 11. Locations of identified restoration/enhancement projects in the Issaquah Creek basin.

Projects Associated with the Issaquah Creek Basin

(in order from the creek mouth to the most upstream)

Issaquah — Stream restoration — Supplementation/reintroduction

Project #	Project Type	Name of Project	Description
1	■	Pickering Reach Habitat Restoration Project	Improve habitat conditions including removal of riprap, add large woody debris, and restore native vegetation.
2	■	Cybil-Madeleine Reach Restoration Project	Improve habitat conditions including regrade banks, add large woody debris, and create side-channel.
3	■	East Fork Issaquah Confluence Reach Restoration Project	Improve habitat conditions including regrade banks, add large woody debris, and addition of gravel.
4	⬢	Issaquah Creek Reintroduction	Supplement or reintroduce kokanee into this creek system.

Table 9. List of four proposed projects to aid in the restoration of kokanee in the Issaquah Creek basin. Project numbers indicate relative location on the stream (downstream to upstream) and do not indicate priority or schedule of implementation.

1 Issaquah Creek Pickering Reach Habitat Restoration - In the near future, the City of Issaquah will start pursuing a large scale restoration project in the Pickering Reach, located between SE 56th Street and I-90. This reach is part of the historic Pickering Farm and as such, the channel was straightened and armored in places. The City controls the west bank through an easement, and property acquisitions are currently being pursued on the east bank (Bush Lane area). Once land is secured through title or landowner commitments, the City will seek grants to initiate design. Restoration would significantly improve floodplain habitat elements, including removal of riprap and floodplain fill, adding LWD to improve instream habitat, and restoring native vegetation.

- Estimated Project Cost: $1.5 million
- Funds Acquired: $0 (City of Issaquah)
- Funds Needed: $1.5 million
- Estimated Project Duration (planning & design): 36 months
- Estimated Project Duration (construction): 24 months
- Current or Potential Project Lead: City of Issaquah

2 Issaquah Creek Cybil-Madeleine Park Reach Restoration Project – City of Issaquah plans to regrade the banks to a gentler slope, add LWD and other pool-forming features, and create side-channel habitat with spawning gravel.

- Estimated Project Cost: $1.6 million
- Funds Acquired: $ 1.6 million (City of Issaquah and grants)
- Funds Needed: $0
- Estimated Project Duration (planning & design): Design completed in 2013
- Estimated Project Duration (construction): Construction scheduled for summer 2014
- Current or Potential Project Lead: City of Issaquah

3 East Fork Issaquah Creek Confluence Reach Project – City of Issaquah plans to remove bank armoring and re-grade the bank to a flatter slope to increase connection to floodplain. Also, large wood will be added to the channel to create pool habitat and native riparian species will be planted on the banks to promote future wood recruitment. Gravel will be excavated from the confluence and redistributed upstream to encourage kokanee spawning.

- (Funding included in project #2.)

4 Supplementation Project – WDFW, King County, and USFWS plan to re-establish the Issaquah Creek kokanee run through a supplementation project. Broodstock will be collected from other Lake Sammamish streams and brought to the Issaquah Fish Hatchery.

- Estimated Project Cost: $16,000/year
- Funds Acquired: $0
- Funds Needed: $16,000/year
- Estimated Project Duration (planning & design): Not scheduled
- Estimated Project Duration (supplementation): Not scheduled
- Current or Potential Project Lead: WDFW

Issaquah Team Members:

Kerry Ritland (City of Issaquah); Kirk Lakey (WDFW); Roger Tabor, Brad Thompson, Jeff Chan (USFWS); and Hans Berge (King County)

References

Berge, H. B., and K. Higgins. 2003. The current status of kokanee in the greater Lake Washington Watershed. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, Washington.

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Tibbetts Creek

Goal/Vision

The goal for Tibbetts Creek is to have a self-sustaining kokanee spawning aggregation (1,000 to 5,000 adults/year) that spawns upstream of the I-90 bridge and is maintained by natural habitat-forming processes. Historic observations (circa 1930s) indicated a strong kokanee run. The KWG anticipates that the kokanee population in Tibbetts Creek can be restored to previously observed levels of spawners.

Tibbetts Creek (WRIA #08.0169) enters Lake Sammamish along its southwestern shoreline (Figure 12). The stream is roughly 4 miles long and originates on Squak Mountain at an elevation of 1,080 feet. The Tibbetts Creek basin is primarily in the City of Issaquah. The creek mouth and lower half mile of the creek are in the Lake Sammamish State Park. The lower part of the basin is in a floodplain shared with Issaquah Creek, while the upper part of the basin is mostly steep terrain that is part of the uplands of Squak and Cougar mountains. The lower part, located within the Urban Growth Area, is mostly urbanized with numerous commercial and residential developments, while the upper basin, located in a rural area, consists of low density residential development, open space, and parklands.

Although Tibbetts Creek is a relatively large system with a large amount of potential spawning area and no major fish passage issues, adult kokanee were not observed over the last two decades until 2012. However, there has been little focused effort to monitor their abundance in this creek. In 2012, over 400 adult kokanee were present in Tibbetts Creek between rivermile 0.6 and 1.6 (Figure 13 and Figure 14). In the 2013-14 return-year, an estimated 167 kokanee (7-day stream-life estimate) spawned in Tibbetts Creek, which was more than in any other stream in the Lake Sammamish system. In addition to the mainstem, kokanee have also been observed in Pickering Creek (WRIA 08.0170), a small low-gradient tributary located in the lower part of the basin. Kokanee were not known to use this small tributary prior to 2012. Eleven kokanee were observed in Pickering Creek (I-90 culvert to 12th Avenue) on a spot check on December 12, 2012. It is unknown if kokanee spawn in other tributaries of Tibbetts Creek, such as Anti-Aircraft Creek (WRIA #08.0169A) or West Fork Tibbetts Creek (WRIA #08.0171).

Several habitat restoration projects have been completed on Tibbetts and Pickering creeks during the last 10 years as part of the Tibbetts Creek Greenway Project. This includes several culvert replacements (NW Sammamish Road, I-90, and Newport Way) and channel restorations (Lake Sammamish State Park, Rowley Properties, and Tibbetts Manor). Currently, a channel relocation project has been proposed for the reach upstream of NW Poplar Way near the I-90 Bridge (Table 10). This is the final remaining Greenway reach, termed Lower Reach 3. Other potential projects include: 1) reconfiguration of the stream channel at the Lake Sammamish State Park entry to increase riparian buffers, and 2) fish passage improvement on West Fork Tibbetts Creek. These later projects are currently in their infancy and further evaluation is needed.

At some stream locations (e.g., near the creek mouth and at NE Gilman Blvd), beaver dams may limit upstream migration of kokanee and inundate spawning riffles. In 2012 and 2013, beaver dams did not appear to limit kokanee migrations and the amount of spawning habitat did not appear to be significantly reduced. At this time, no specific project is proposed but some sites need to be monitored and evaluated.

A major concern for kokanee populations in Tibbetts Creek is water quality. Previous water quality sampling has indicated the basin has relatively high sedimentation and subsequent high turbidities, high nitrate and ammonia concentrations, elevated fecal coliforms, and low dissolved oxygen concentrations (City of Issaquah 2011). Additional monitoring of water quality is needed to determine if conditions have improved.

Additional information on Tibbetts Creek can be found in the following reports: City of Issaquah (2011), King County (1996), and The Watershed Company (2005, 2006).

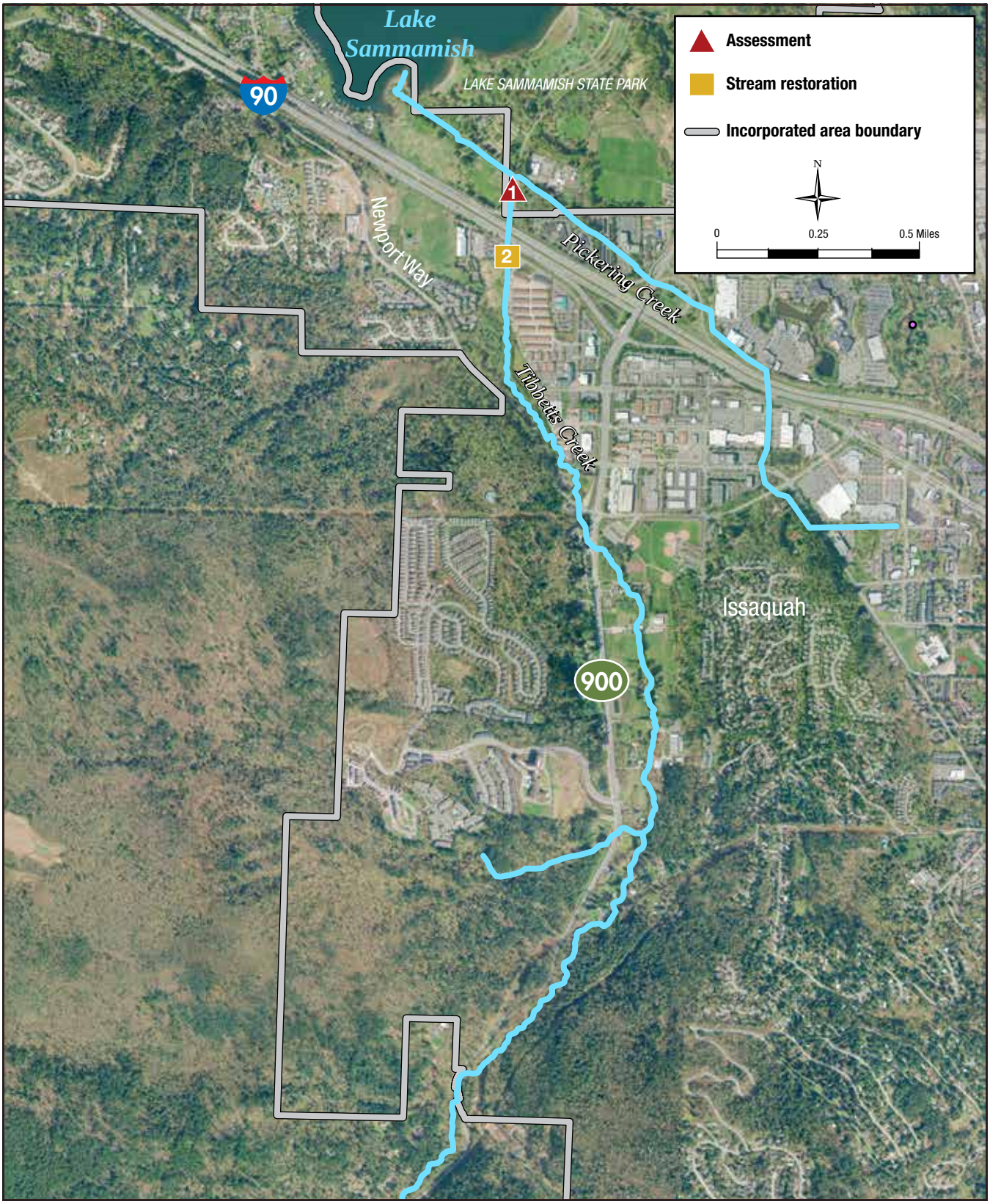

Figure 12. Location of identified restoration/enhancement projects on Tibbetts Creek. Pickering Creek is also shown (adult kokanee have been observed in this tributary).

Figure 13. Kokanee spawning reach in Tibbetts Creek, December 2012. The left photograph is looking upstream from NW Popular Way near the I-90 Bridge. This is the site of the proposed stream relocation project (Tibbetts Creek Greenway Lower Reach 3). The right photograph was taken just upstream of 17th Avenue NW in the Tibbetts Valley Park (photo credit: Roger Tabor, USFWS).

Projects Associated with Tibbetts Creek

(in order from the creek mouth to the most upstream)

1 **Water Quality Monitoring and Assessment** – Continued water quality sampling will help measure changes and trends in aquatic resource health. Also, this monitoring will help evaluate the effectiveness of current and future stormwater management and habitat restoration programs. This project will be conducted by the City of Issaquah.

- Estimated Project Cost: ongoing ambient monitoring program – no funds needed
- Current or Potential Project Lead: City of Issaquah

2 **Stream relocation above NW Poplar Way Bridge** (Tibbetts Creek Greenway Lower Reach 3) – City of Issaquah plans to relocate and restore the stream channel to provide stream complexity (LWD, pools, riffles). This project is contingent on landowner cooperation, which has not been possible in the past. Development proposals for the properties may provide an opportunity in the next few years.

- Estimated Project Cost: $350,000
- Funds Acquired: $0 (City of Issaquah)
- Funds Needed: $350,000
- Estimated Project Duration (planning & design): Not scheduled
- Estimated Project Duration (construction): Not scheduled
- Current or Potential Project Lead: City of Issaquah

Figure 14. Kokanee spawning reach (between 12th Avenue and I-90 culvert) in Pickering Creek, December 2012 (photo credit: Roger Tabor, USFWS).

Tibbetts ▲ Assessment ■ Stream restoration

Project #	Project Type	Name of Project	Description
1	▲	Water Quality Monitoring and Assessment	Continue water quality sampling.
2	■	NW Poplar Way Stream Restoration	Restore stream channel to provide stream complexity (large woody debris, pools, riffles).

Table 10. List of two proposed projects to aid in the restoration or monitoring of kokanee spawning habitat on Tibbetts Creek. Project numbers indicate relative location on the stream (downstream to upstream) and do not indicate priority or schedule of implementation.

Tibbetts Team Members:

Kerry Ritland (City of Issaquah); Kirk Lakey (WDFW); Roger Tabor, Brad Thompson, Jeff Chan (USFWS); and Hans Berge (King County)

References

City of Issaquah. 2011. State of our waters, fourth report. Issaquah Aquatic Resources Monitoring Report 1999-2010, Public Works Engineering Department and Resource Conservation Office, Issaquah, Washington.

King County. 1996. Final Issaquah Creek Basin and nonpoint action plan. King County Department of Natural Resources and Issaquah/East Lake Sammamish Watershed Management Committee, Seattle, Washington.

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The Watershed Company. 2006. Stream and riparian areas restoration plan. Report of the Watershed Company to the City of Issaquah, Washington.